WHAT IS CLAIMED:

1. A method for determining a new path through a data network that accounts for priority levels associated with established paths in the data network.

2. The method in claim 1, further comprising:
determining a priority level associated with the new path.

3. The method in claim 2, further comprising:
determining a resource requirement associated with the new path.

4. The method in claim 2, further comprising:
analyzing priority level information associated with data network links.

5. The method in claim 4, further comprising:
using the priority level information, selecting as the new path a path that has a minimal impact on established paths having a priority level lower than the priority level associated with the new path.

6. The method in claim 5, further comprising:
taking into account which or how many priority levels of established paths would be preempted by different path candidates.

7. The method in claim 1, further comprising:
selecting as the new path a shortest path from different path candidates having a requisite bandwidth and requisite priority with a least preemptive effect on established paths.

8. The method in claim 1, further comprising:
selecting as the new path a path that reduces preemption of lower priority established paths.

9. The method in claim 1, further comprising:

selecting as the new path a path that preempts a lowest priority level established path.

10. The method in claim 1, further comprising:

selecting as the new path a path that preempts a least amount of reserved resources of an established path.

11. The method in claim 1, further comprising:

selecting as the new path a path that preserves a largest amount of unreserved resources of an established path at a lowest priority level.

12. A method for selecting a new path through a data network that accounts for preemption of an established path in the data network by the new path.

13. The method in claim 12, further comprising:

using one or more parameters to estimate the preemption.

14. The method in claim 13, wherein the one or more parameters include a maximum bandwidth for each link in the data network.

15. The method in claim 13, wherein the one or more parameters include a maximum reservable bandwidth for each link in the data network.

16. The method in claim 13, wherein the one or more parameters include an available bandwidth at each of multiple priority levels for each link in the data network.

17. The method in claim 12, further comprising:

selecting a path with a minimal number of preempted priority levels.

18. The method in claim 12, further comprising:

selecting a path with a minimal preempted bandwidth.

19. The method in claim 12, further comprising:

at an affected priority level, selecting a path with a minimal bandwidth of the affected priority level.

20. The method in claim 12, further comprising:

selecting a path that maximizes unreserved bandwidth at a lowest priority level.

21. The method in claim 12, further comprising employing one or more of the following to reduce preemption:

(1) selecting a path that minimizes a number of preempted priority levels,

(2) selecting a path that minimizes a the total amount of preempted bandwidth,

(3) at an affected priority level, selecting a path that minimizes a bandwidth of the affected priority level, and

(4) selecting a path that maximizes unreserved bandwidth at a lowest priority level.

22. The method in claim 21, further comprising:

selecting a shortest path from candidate paths that satisfy one or more of (1)-(3).

23. The method in claim 12, wherein the paths are Label Switched Paths (LSPs) established using Multi-Protocol Label Switching (MPLS).

24. The method in claim 23, further comprising:

determining data network link attributes provided by various label switched routers in the data network, and

storing the determined link attributes in a database.

25. The method in claim 24, wherein the data network link attributes are provided by Interior Gateway Protocol (IGP) extensions.

26. The method in claim 24, further comprising:

determining a highest priority level on which preemption will occur to establish a new LSP;

determining a bandwidth that will be preempted by the new LSP; and

determining a total bandwidth that will be preempted on all priority levels by the new LSP and the unreserved bandwidth at a lowest priority level.

27. The method in claim 26, further comprising minimizing preemption of established paths by performing one or more of the following:

(1) minimizing affected priority levels;

(2) at the affected priority level, minimizing the bandwidth preempted;

(3) maximizing unreserved bandwidth at a lowest priority level along the path; and

(4) any combination of (1)-(3).

28. A method for selecting a new path through a data network that reduces or minimizes a preemptive effect on one or more established paths in the data network by the new path.

29. The method in claim 28, further comprising:

determining a priority level and a bandwidth associated with the new path.

30. The method in claim 29, further comprising:

determining bandwidth reservations for each link in the data network including a maximum bandwidth and an available bandwidth at each priority level.

31. The method in claim 30, further comprising:

eliminating links with insufficient resources to support the new path.

32. The method in claim 31, further comprising:

restricting remaining links to least cost paths.

33. The method in claim 31, further comprising:

for remaining paths , determining one or more of the following: (1) which lower priority level or levels will be affected by set up of the new path, (2) how much reserved bandwidth will be preempted at each priority level by the new path, and (3) how much free bandwidth is available at a lowest priority level.

34. The method in claim 33, further comprising:

selecting from one or more of (1)-(3) a path that preempts the lowest priority level, the least amount of reserved bandwidth, or most amount of unreserved bandwidth at the lowest priority level.

35. The method in claim 28, wherein the path selection is made using a Constrained Shortest Path First (CSPF)-based algorithm.

36. Apparatus for determining a new path through a data network comprising:

a database for storing attributes for links in the data network including priority level information associated with the data network links, and

data processing circuitry coupled to the database and configured to determine the new path taking into account the priority level information associated with the data network links stored in the database.

37. The apparatus in claim 36, wherein the data processing circuitry is configured to determine a priority level associated with the new path.

38. The apparatus in claim 37, wherein the data processing circuitry is configured to determine a resource requirement associated with the new path.

39. The apparatus in claim 37, wherein the data processing circuitry is configured to analyze priority level information associated with data network links.

40. The apparatus in claim 39, wherein the data processing circuitry is configured to use the priority level information in selecting as the new path a path that has a minimal impact on established paths having a priority level lower then the priority level associated with the new path.

41. The apparatus in claim 40, wherein the data processing circuitry is configured to take into account which or how many priority levels of established paths would be preempted by different path candidates.

42. The apparatus in claim 36, wherein the data processing circuitry is configured to select as the new path a shortest path from different path candidates having a requisite bandwidth and requisite priority with a least preemptive effect on established paths.

43. The apparatus in claim 36, wherein the data processing circuitry is configured to select as the new path a path that reduces preemption of lower established paths.

44. The apparatus in claim 36, wherein the data processing circuitry is configured to select as the new path a path that preempts lowest priority level established paths.

45. The apparatus in claim 36, wherein the data processing circuitry is configured to select as the new path a path that preempts a least amount of reserved resources of an established path.

46. The apparatus in claim 36, wherein the data processing circuitry is configured to select as the new path a path that preserves a largest amount of reserved resources of an established path at a lowest priority level.

47. A router for use in a data communications network, comprising:

path selection circuitry configured to determine a new path through the data network taking into account preemption information associated with data network links stored in the database; and

data packet forwarding circuitry configured to forward data packets on established paths.

48. The router in claim 47, further comprising:

a database coupled to the path selection circuitry for storing attributes for data network links.

49. The router in claim 48, wherein the path selection circuitry is configured to use one or more attributes to estimate the preemption.

50. The router in claim 48, wherein the one or more attributes includes a maximum bandwidth for each data network link.

51. The router in claim 48, wherein the one or more attributes includes a maximum reservable bandwidth for each data network link.

52. The router in claim 48, wherein the one or more attributes includes an available bandwidth at each of multiple priority levels for each data network link.

53. The router in claim 48, wherein the path selection circuitry is configured to select a path that reduces a number of preempted priority levels.

54. The router in claim 48, wherein the path selection circuitry is configured to select a path that reduces a total amount of preempted bandwidth.

55. The router in claim 48, wherein at an affected priority level, the path selection circuitry is configured to select a path that reduces a bandwidth of the affected priority level.

56. The router in claim 48, wherein the path selection circuitry is configured to select a path that reduces unreserved bandwidth at a lowest priority level.

57. The router in claim 48, wherein the path selection circuitry is configured to employ one or more of the following to reduce preemption by:

(1) selecting a path that minimizes a number of preempted priority levels,

(2) selecting a path that minimizes a total amount of preempted bandwidth,

(3) at an affected priority level, selecting a path that minimizes a bandwidth of the affected priority level, and

(4) selecting a path that maximizes unreserved bandwidth at a lowest priority level.

58. The router in claim 57, wherein the path selection circuitry is configured to select a shortest path from candidate paths that satisfy one or more of (1)-(3).

59. The router in claim 48, wherein the paths are Label Switched Paths (LSPs) established using Multi-Protocol Label Switching (MPLS), the router is a Label Switched Router (LSR), and the path selection circuitry and database are part of a traffic engineering path selection module.

60. The router in claim 59, wherein the LSR includes a module that receives link attributes from various label switched routers in the data network, and provides them for storage in the database.

61. The router in claim 60, wherein the link attributes are provided by Internet Gateway Protocol (IGP) extensions.

62. The router in claim 60, wherein the path selection circuitry is configured to use link attributes in selecting the new path.

63. The router in claim 47, wherein the path selection circuitry is configured to employ a Constrained Shortest Path First (CSPF)-based algorithm to select the new path.

64. The router in claim 60, wherein the path selection circuitry is configured to:

determine a highest priority level on which preemption will occur in establishing a new LSP;

determine a bandwidth that will be preempted by the new LSP; and

determine a total bandwidth that will be preempted on all priority levels by the new LSP and the unreserved bandwidth at a lowest priority level.

65. The router in claim 60, wherein the path selection circuitry is configured to minimize preemption of links by performing one or more of the following:

(1) minimizing affected priority levels along the path;

(2) at the affected priority level, minimizing the bandwidth preempted;

(3) maximizing unreserved bandwidth at a lowest priority level along the path;

(4) any combination of (1)-(3).

66. A Label Switched Router (LSR), comprising:

means for storing attributes of links in a data network;

means for selecting a new path through a data network that minimizes a preemptive effect on one or more established paths in the data network by the new path; and

means for forwarding data packets on established paths.

67. The LSR in claim 66, further comprising:

means for determining a priority level and a bandwidth associated with the new path.

68. The LSR in claim 67, further comprising:

means for determining bandwidth reservations for data network links including a maximum bandwidth and an available bandwidth at each priority level.

69. The LSR in claim 68, further comprising:

means for eliminating links with insufficient resources to support the new path.

70. The LSR in claim 69, further comprising:

means for restricting remaining links to least cost paths.

71. The LSR in claim 69, further comprising:

means for remaining links, determining one or more of the following: (1) which lower priority level or levels will be affected by set up of the new path, (2) how much reserved bandwidth will be preempted at each priority level by the new path, and (3) how much free bandwidth is available at a lowest priority level.

72. The LSR in claim 72, further comprising:

means for selecting a path that preempts the lowest priority level, the least amount of reserved bandwidth, or most amount of unreserved bandwidth at the lowest priority level.